

REMARKS/ARGUMENTS

This supplementary amendment is respectfully submitted to replace the amendment submitted on November 13, 2006. Reconsideration of this application and favorable action are solicited. In order to more particularly point out and distinctly claim that which the applicants regard as their invention, Claim 1 has been amended. No new matter is introduced.

103 Rejections over claims 1-12

Claim 1 was rejected under 35 U.S.C. 103(a) as being unpatentable over Hong et al. (US 6,429,057) in view of Rioux (US 5,554,488).

Claims 1 has been amended to incorporate the limitations recited on the third and forth paragraphs of Summary of Invention "...depositing a dual-metal layer such as Mo/AlNd, MoW/AlNd, MoW/Al onto the main surface of the substrate..." and "...more reliable end-point detection in the first metal dry etching process can be used...." Acceptance of the amended claim 1 is respectfully requested.

The amended claim 1 includes the limitation "...depositing a molybdenum-containing metal layer on a glass substrate, wherein said molybdenum-containing metal layer is a dual-metal layer." In addition, the amended claim 1 also includes the limitation "using said patterned photoresist as an etching mask, uniformly etching said molybdenum-containing metal layer to form said gate and word line array pattern having substantially oblique sidewalls, wherein said etching of said molybdenum-containing metal layer uses gas mixture, wherein said etching of said molybdenum-containing metal layer is detected by an end-point detection method," which none of the cited references, alone or in combination, has taught, implied or suggested."

As disclosed on the forth paragraph of Summary of Invention "Further, the **etching selectivity** between the upper metal and the lower metal of the dual-metal layer is **increased** such that **end-point detection which is more reliable in the first metal dry etching process can be used**." By means of the end-point detection method, it improves or avoids

(1) the etching uniformity though out the panel,

- (2) just etching time,
(3) premature introduction of the etching gas before the total removal of an upper layer,
(4) generation of low-volatile contaminants,
5 (5) over-etching of the lower layer, and
(6) Mura defects or white pad effects known in the art.

The present invention relates to a method for fabricating **liquid crystal display devices**. Utilization of more reliable end-point detection in the first metal dry etching process alleviates or eliminates Mura defects of LCD panels. Gate and word line
10 pattern made of dual-metal structure (i.e. a conductive layer) such as Mo/AlNd, MoW/AlNd, or MoW/Al are on a flat, clean surface of a glass substrate when the etching process is initiated (See the first paragraph of Detailed Description).

Rioux teaches a method of forming a **semiconductor structure** based on a lift-off masking process "...which avoids blanket deposition of gate metal which would require
15 etching of metal from the substrate (See col. 3, line 35-49)." Based on the illustration of FIG. 6 and the corresponding description "A first conductive layer of tungsten silicide 46 is then deposited overall by sputtering, and thus forms a Schottky gate contact with the substrate surface 42 in the gate opening 44 (FIG. 6)," it is clear that the conductive layer of tungsten silicide 46 is **NOT** on the substrate surface 42 until this step is performed.
20 Furthermore, in FIG. 3, **NONE of those layers**, the surface oxide layer 32, the first masking layer 34 of silicon dioxide and the second masking layer 36 of silicon originally on the substrate wafer 30, is a molybdenum-containing metal layer, i.e. a conductive layer.

25 There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art." ... (The combination of the references taught every element of the claimed invention, however without a motivation to combine, a rejection based on a *prima facie* case of obvious was held improper.)

30 ~ Extracted from MPEP 2143.01 ~

The applicants hence assert that Rioux (US 5,554,488) does not establish a

motivation to combine references. First, considering the fact that the present invention relates to a method for fabricating **liquid crystal display devices**, Rioux (US 5,554,488) otherwise teaches a method of forming a **semiconductor structure**. These are two **DIFFERENT technical categories**. The combination of different technical

5 categories is intrinsically difficult. Second, for the method of Rioux (US 5,554,488), the conductive layer 46 is not originally present on the **wafer substrate 30** but later deposited. On the contrary, the dual-metal structure (i.e. a conductive layer) of the present invention is on a flat, clean surface of a **glass substrate**. In other words, different layers are on different substrates. Third, none of the cited references, alone or in

10 combination, has ever taught, implied or suggested the many advantages of using an end-point detection method while etching the molybdenum-containing metal layer.

In the light of the above reasons and lack of motivation, the applicants firmly believe that these distinct features distinguish the present invention from the cited prior art references. To sum up, claims 1 is patentable over Hong et al. (US 6,429,057)

15 in view of Rioux (US 5,554,488).

It is respectfully suggested that, taking the above into consideration, none of the cited references, alone or in combination, teaches or makes obvious all of the limitations of the amended claim 1. Reconsideration of claim 1 is therefore politely requested. As claims 2-12 are dependent upon claim 1, they should be allowable if

20 claim 1 is allowed. Reconsideration of claims 2-12 is therefore politely requested.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Sincerely yours,

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10 Note: Please leave a message in my voice mail if you need to talk to me. (The time in D.C. is 13 hours behind the Taiwan time, i.e. 9 AM in D.C. = 10 PM in Taiwan.)